PATENT
Case No. 285/502

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Daniel J. Mattson et al.
Serial No.: 09/558,386
Filing Date: April 25, 2000
For: SYSTEM FOR DETECTING AND RELEASING A PERSON LOCKED IN THE TRUNK OF A VEHICLE

Examiner: Davetta Woods Goins
Group Art Unit No. 2632

DECLARATION OF KERRY S. BERLAND UNDER 37 CFR § 1.131

I, Kerry S. Berland, declare the following, based upon my personal knowledge and on information and belief:

1. I am a joint inventor of the invention (hereinafter the "Invention") described and claimed in the above-identified patent application (hereinafter the "Application").

2. I participated in the conception and reduction to practice of this Invention as a consultant for The Cherry Corporation, the owner of record of this Application.

3. The Invention concerns detecting the presence of a person trapped in the trunk of a vehicle, such as an automobile, and automatically opening the trunk to release this person.

4. The other joint inventors, Daniel J. Mattson and Kenneth C. Kunin and I conceived of an apparatus and system whereby the presence of a person trapped in the trunk of a vehicle can be detected by either sensing the heat or motion of the person in the trunk, or detecting the carbon dioxide (CO_2) released by the respiring person in the trunk. In either case, it was conceived that an automated system would sense the interior condition of the trunk for a moving or respiring person for a defined sensing time period after the trunk is opened and then closed. If a person is not detected during this sensing period, it was determined that the system would be turned off in order to conserve operational power for the vehicle. The sensing system is activated again for the same sensing period whenever the trunk is opened and then closed. It was also

determined that the trunk would be opened to free a sensed trapped person only if a safe stationary operational condition of the vehicle is sensed.

5. I am advised that a PCT reference No. WO 99/04119, entitled Trunk Lid Emergency Opening Apparatus of Automobile (hereinafter the "Kim Reference"), was published on January 28, 1999, and discloses at page 19, line 26, a system with an "ultra red" sensor (presumably an infrared sensor) which detects the presence of a person in the trunk of a vehicle, and automatically opens the trunk when the person is detected.

6. I am also advised that U.S. Patent No. 6,222,442, entitled Vehicle Trunk Compartment Emergency Release and Warning System and Method (hereinafter the "Gager et al Patent"), filed March 29, 1999, discloses a system that detects the heat or motion of a person in a trunk of a vehicle, for example by using an infrared sensor, and automatically opens the trunk when the presence of the person is detected.

7. Prior to January 28, 1999, Daniel J. Mattson, Kenneth C. Kunin and other employee's of the Cherry Corporation met in a brainstorming meeting to discuss emergency trunk release systems that could employ various kinds of detectors to sense the presence of a person in the trunk of a vehicle and release the sensed person by automatically opening the trunk. Attached Exhibit A shows materials that were used at the meeting to initiate consideration of such emergency systems. Attached Exhibit B is a note taken during the meeting that states a CO_2 sensor or an infrared sensor could be employed to detect the presence of a person in the trunk of a vehicle. Attached Exhibit C is a note taken during the meeting concerning a solenoid-activated trunk latch that could be operated to automatically open the trunk when a trapped person is detected. Attached Exhibit D is a sketch of a solenoid-activated trunk latch. Attached Exhibit E references conditions, such as ignition off and trunk closed, that could initiate detecting a person in the trunk by sensing CO_2 respiration or movement. It is also noted that the sensing system would "time out". Attached Exhibit F is a note from the meeting that suggests activating the sensing system after a delay following closing the trunk and a seat having trunk-access. It is further noted that the ignition or park switch of the vehicle could be used to indicate the operational condition of the vehicle, so that

the system could be disabled to avoid automatic opening of the trunk, for example when the vehicle is moving.

8. After the brainstorming meeting at Cherry and before January 28, 1999, I was engaged by Cherry to assist in developing an emergency trunk release system. Attached Exhibit G includes two quotations which I provided prior to January 28, 1999 for work on this project. The quotations summarize some of the discussions of the brainstorming meeting and my own conceptions, and propose a detailed outline of implementation for reducing an emergency trunk release system to practice.

9. As demonstrated by the above-referenced exhibits, prior to January 28, 1999, a system was conceived for Cherry, which would automatically release a person from the trunk of a vehicle after the presence of the person is detected, and when the operational condition of the vehicle allows a safe exit from the trunk.

10. I and Jeff Hunsinger, an employee at my direction, diligently pursued a reduction to practice of the conceived infrared trunk release system from a time after the reported brainstorming meeting to a time before January 28, 1999, when a prototype of infrared sensing apparatus was built and tested. The reduction to practice of the conceived infrared sensing trunk release system is reported in attached Exhibit H, which is a contemporaneous report of time expended by me and Mr. Hunsinger on the project to develop the trunk release system in association with an infrared sensor. The time entries "Build prototype and test" and "Get working prototype" describe work that occurred to reduce the infrared trunk release system to practice prior to January 28, 1999. All entries of Exhibit H report activities that occurred prior to January 28, 1999.

11. As noted in the time entries of Exhibit H, before January 28, 1999, the apparatus of a reduction to practice of the infrared trunk release system was tested to verify that an infrared sensor could detect the presence of a nearby person, and upon detecting the person, could generate an electrical signal for operating a solenoid which would open the trunk of a vehicle in a conventional manner.

12. Attached as Exhibit I is a circuit diagram of an interface for the infrared trunk occupancy sensor. This circuit diagram was prepared before January 28, 1999.

13. The Invention, particularly as it relates to an infrared trunk release system, was conceived and reduced to practice on behalf of Cherry, before the January 28,

1999 publication date of the Kim Reference and the March 29, 1999 filing date of the Gager et al. patent.

14. The attached Exhibits A-I are copies of original documents which were all made prior to January 28, 1999. Dates and information from which dates can be derived in certain of these documents have been redacted from the attached copies.

15. All events reported in this Declaration and the attached Exhibits A-I occurred in the United States before January 28, 1999.

I declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and I am warned that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. § 1001) and may jeopardize the validity of the subject Application or any patent issuing thereon.

Date: November 3, 2003

Kerry S. Berland

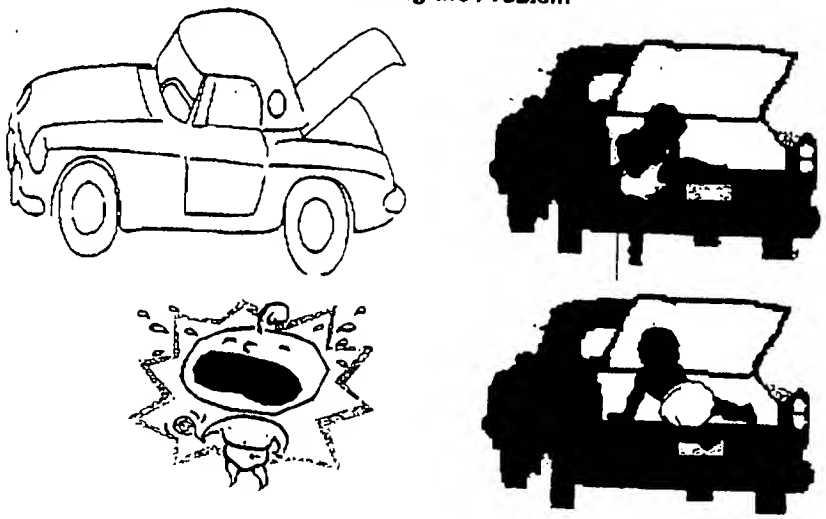
The Cherry Corporation

Emergence Trunk Exit Brainstorming Session

Cherry
Emergence Exit Trunk Latch
Agenda

• Define The Problem: Group	(9:00-9:30)	Kea Kunio
• Review Vehicles:	(9:30-10:00)	Group
– Power Trunk Release – Manual Trunk Release – Key Only Trunk Release		
• Break Into Teams To Define Concepts	(10:60-12:00)	Group
• Lunch:	(12:00-1:00)	
• Present Concepts To Other Teams	(1:00-2:00)	Group
• Select Best Proposals	(2:00-2:30)	Group
• Define Development Timelines & Cost Estimates For The (3) Selected Proposals	(2:30-4:00)	Group
• Define the (3) proposals in a format appropriate for presentation to the customer. Teams to complete by '		

Cherry
Emergence Exit Trunk Latch
Defining the Problem



Cherry
Emergence Exit Trunk Latch
Defining the Problem

- Children are dieing from locking themselves in the trunks of vehicles.

- We would like to identify a means to detect an occupant in the trunk and then open the trunk free the occupant.

Cherry
Emergence Exit Trunk Latch
Defining the Problem

- **GM Thinks A Switch Is The Answer**
  - Low current backlighting
  - 30 to 60 minute sleep mode
  - Reset when trunk is opened or closed

- **If A Switch Then:**
  - Location must be accessible by children
  - A child's psychology should be taken into consideration.
    (Color of backlighting, shape and size of switch or type of graphic)
    - **Mickey Mouse**
    - **Power Ranger**

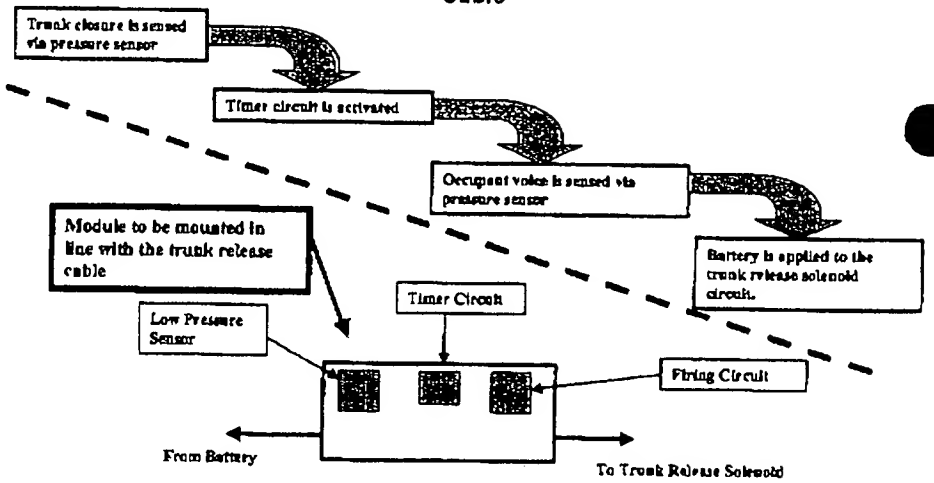
Cherry
Emergence Exit Trunk Latch
Defining the Problem

- **A Different View Might Be A Passive Device**
  - **Activated when the trunk is closed**
  - **Timer based system. Possible 15 or 30 min sleep modes.**
  - **Sensor to sense occupant**
    - **Type of sensor?**
  - **Automatic release of trunk latch via cable.**
- **If A Passive Device Then:**
  - **Sensor location must be such that a occupant can be sensed. (children)**
  - **A child's psychology should be taken into consideration.**
    - **What type of movement and for how long?**
    - **What type of sounds and for how long?**

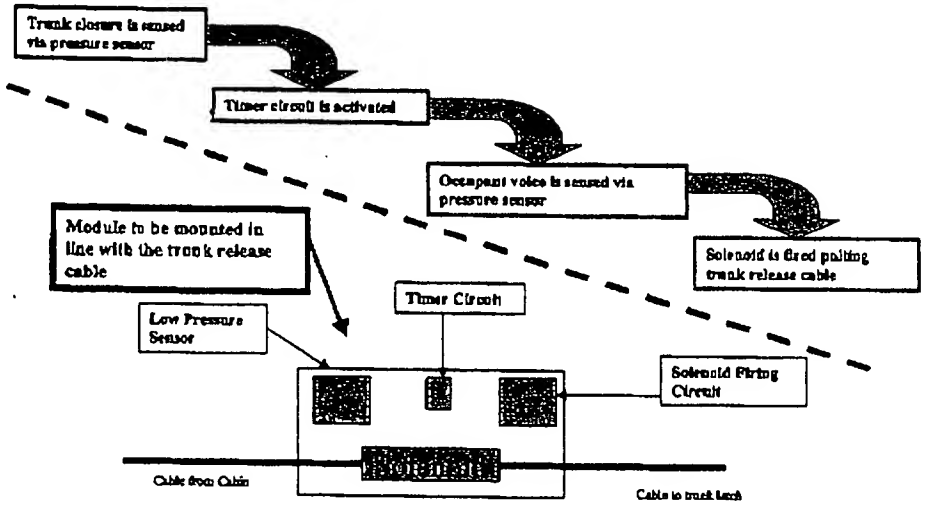
Cherry
Emergence Exit Trunk Latch
Defining the Problem

- **Three type of vehicle applications need to be considered. This may drive three solutions however (1) solution is preferred.**
  - **A dealer kit design For installation into existing vehicles.** (No older then 10 Yrs)
  - **A drop in designs for vehicles currently under development**
  - **A design for the next generation vehicles to be developed.**

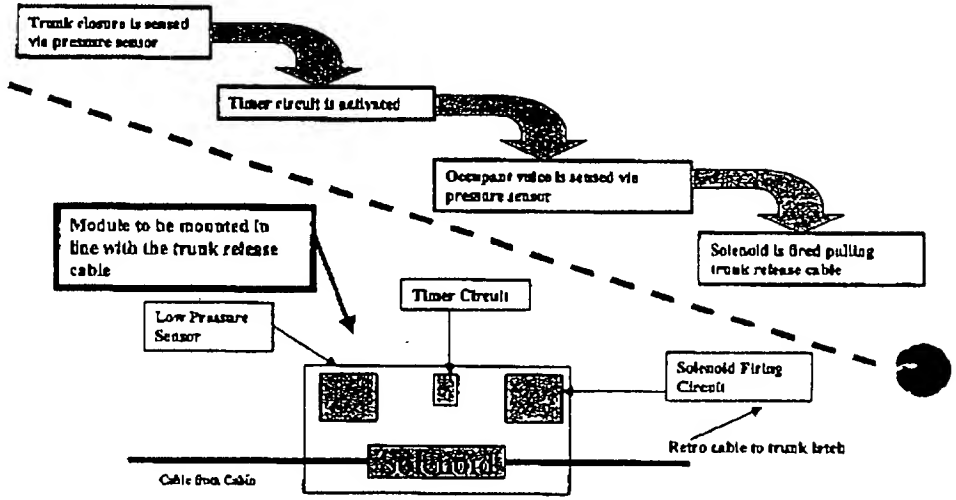
Cherry
Emergence Exit Trunk Latch
Passive System For Cars With Electromechanical Truck Release Cable



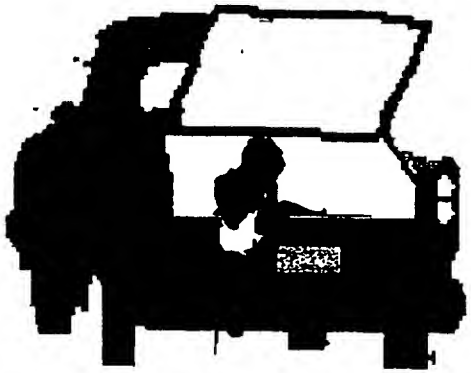
Cherry
Emergence Exit Trunk Latch
Passive System For Cars With Manual Truck Release Cable



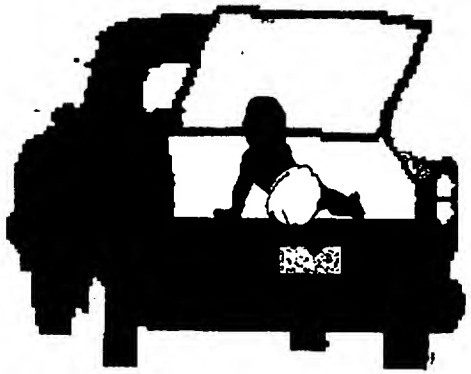
Cherry
Emergence Exit Trunk Latch
Passive System For Cars Without Truck Release Cable



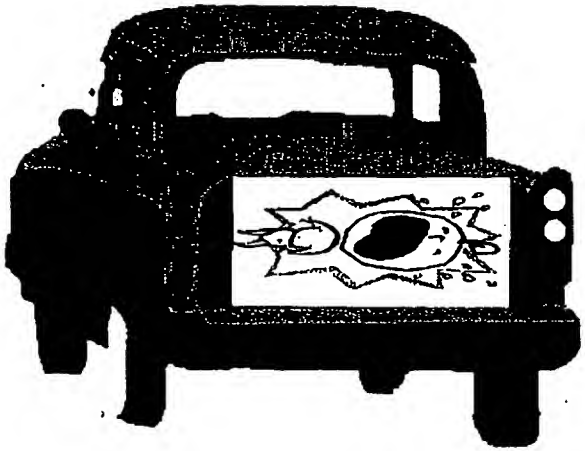
Cherry
Emergence Exit Trunk Latch
Defining the Problem



Cherry
Emergence Exit Trunk Latch
Defining the Problem



Cherry
Emergence Exit Trunk Latch
Defining the Problem



Cherry
Emergence Exit Trunk Latch
Defining the Teams

Team C
Leader: Ken Kunin
- Jim Broyles
- Ed Ramsden
- Mark Brzozowski
- Konrad Walzer

Team B
Leader: Ross Curran
- Pete Mueller
- Dain Mattson
- John Weingart
- Kent Thomas

Team D
Leader: Jeff Kaul
- Steven Kostrova
- Tom Obrien
- Mark Yarbrough
- Paul Yuska

Cherry
Emergence Exit Trunk Latch
Agenda

- **Review Vehicles:** **(9:30-10:00)**
  - **Power Trunk Release**
  - **Manual Trunk Release**
  - **Key Only Trunk Release**

Cherry
Emergence Exit Trunk Latch
Agenda

- **Break Into Teams**
  To Define Concepts: **(10:00-12:00)**

Cherry
Emergence Exit Trunk Latch
Agenda

- **Lunch:** **(12:00-1:00)**

Cherry
Emergence Exit Trunk Latch
Agenda

- **Present Concepts To Other Teams:**

(1:00-2:00)

Cherry
Emergence Exit Trunk Latch
Agenda

- **Select Best Proposals:**

(2:00-2:30)

Cherry
Emergence Exit Trunk Latch
Agenda

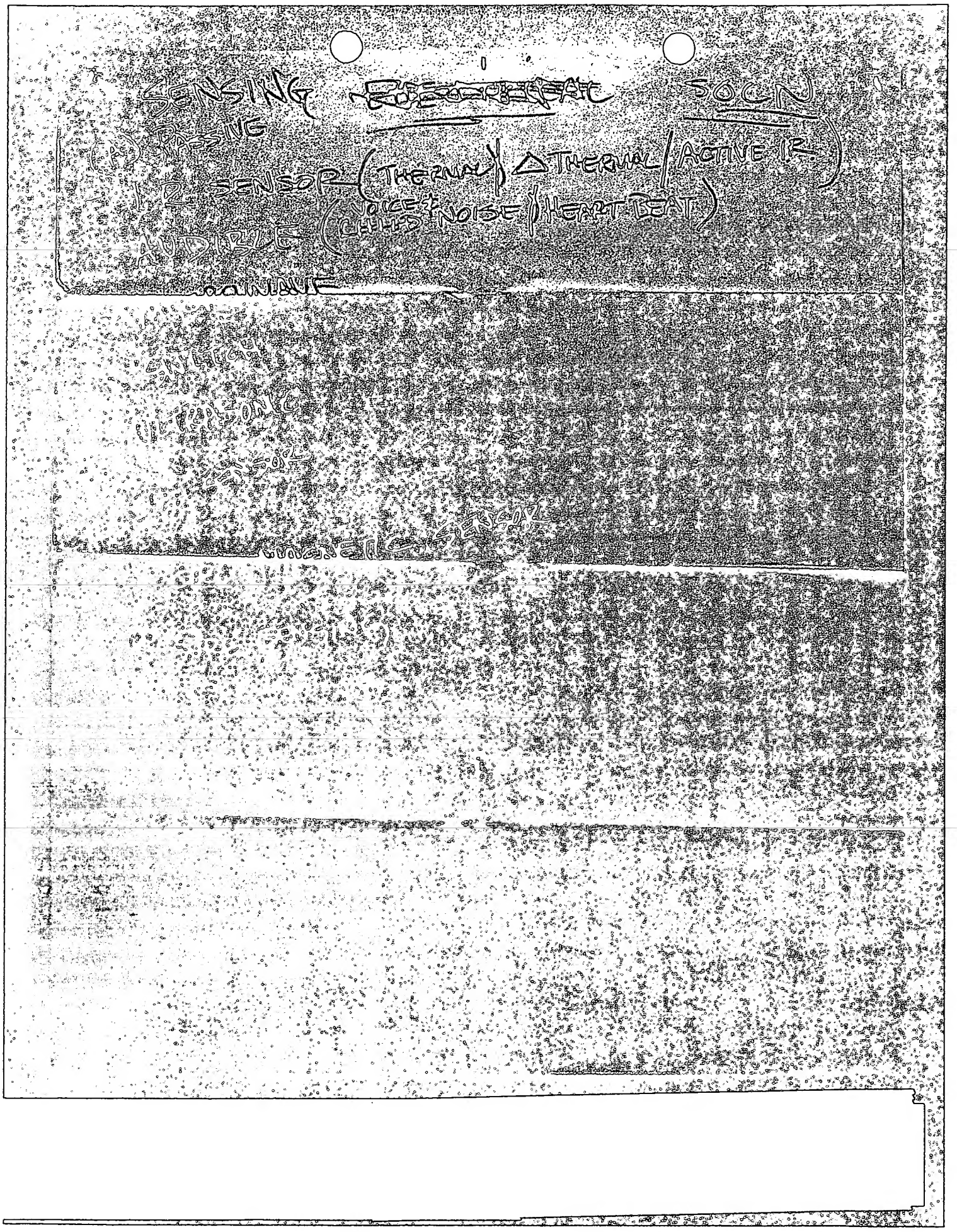
- **Define Development Timelines &**
  Cost Estimates For The (3) Selected Proposals :

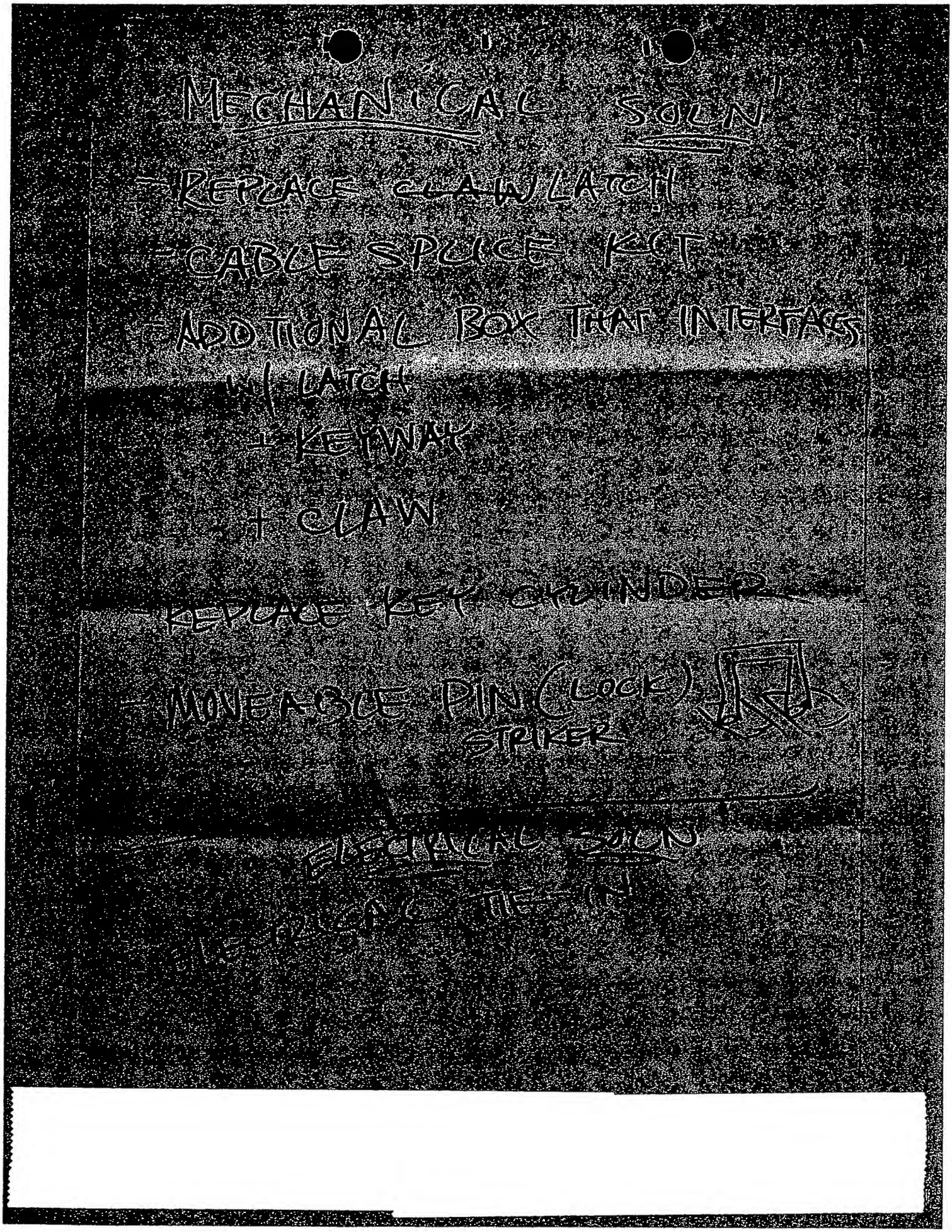
(2:30-4:00)

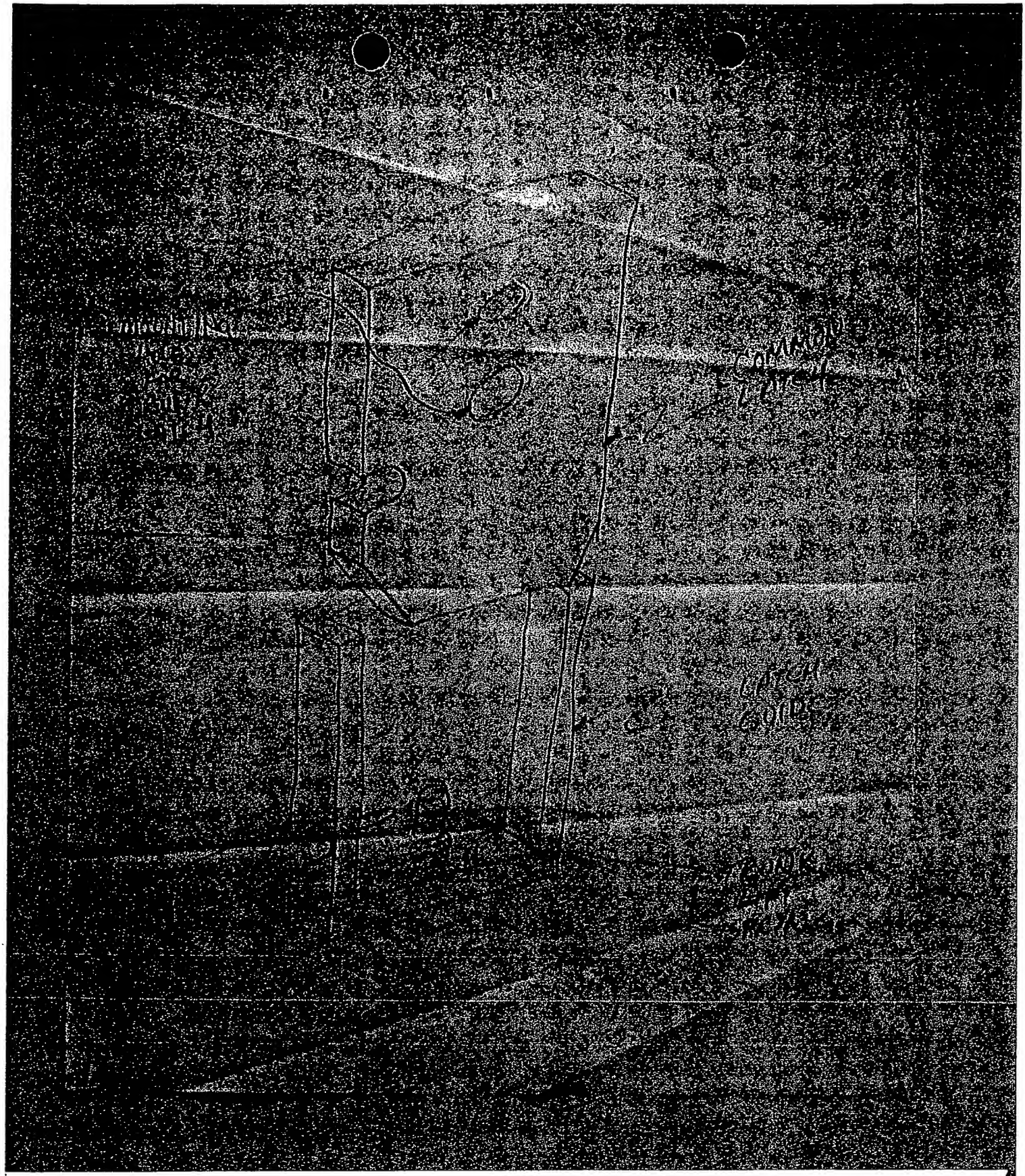
Cherry
Emergence Exit Trunk Latch
Agenda

- **Define the (3) proposals in a format Appropriate for presentation to the customer.**

Teams to complete by







INPUTS TO SYSTEM

[illegible]

[illegible]

SYSTEM ACTIVE

Monitor [illegible]

Monitor Alarm [illegible]

[illegible]

• SEAT & TRUNK [illegible]
[illegible] DUTY

• [illegible] SENSOR

• POWER DOWN (60 MIN)

• PASSIVE ~~[illegible] SYS.~~

• INHIB OR PARK SWITCH TO
~~DEACTIVATE~~ SYSTEM
[illegible] HOLD

~~• [illegible] [illegible] [illegible]~~

SILICON ENGINES

Via email to dmattson@cherrycorp.com

Mr. Daniel Mattson
CHERRY AUTOMOTIVE
3600 Sunset Avenue
Waukegan, IL 60087

QUOTATION CQ981215

Dear Mr. Mattson:

This letter is a follow-up to the meeting held with you at Cherry in Waukegan on to discuss the **Emergency Exit Trunk Latch** project. Present from Silicon Engines were Jeff Hunsinger, Mitch Budniak, and the undersigned, Kerry Berland.

Silicon Engines very much appreciates the opportunity to quote on providing engineering assistance to Cherry Automotive relating to this Sensor Group project.

PROJECT DESCRIPTION

Cherry Automotive has become aware of the market need for an **Emergency Exit Trunk Latch**, a device intended to help prevent a small child from being inadvertently locked within the trunk of a car. In a typical scenario, an adult leaves the trunk open—for example, while unloading groceries. The child climbs into the trunk; the trunk closes; and the child cannot get out.

The simplest product would feature a lighted pushbutton switch—with a smiling face logo, or in the familiar shape of a doorknob—that the child could push to actuate the Emergency Exit Trunk Latch, opening the trunk.

However, after studying the problem in an internal focus group, Cherry Automotive believes that an automatic sensor might significantly reduce the likelihood that the child could not escape. Cherry's Sensor Group has decided to investigate appropriate sensor technologies for an automatic version of the Emergency Exit Trunk Latch.

SENSOR OPTIONS

Cherry is investigating several sensor technologies for their potential in this product. These include:

1. **IR.**
2. **Capacitive.**
3. **CO_2.**
4. **Microwave.**
5. **Ultrasonic.**

In our meeting on , we agreed to focus initially on the first two—IR and capacitive.

INFRARED DETECTORS

IR detectors are widely used to detect motion. Commercially available products include anti-theft motion detectors within buildings; porch light motion detectors; and automatic water faucets in public lavatories. In this project, we plan to use IR detectors of this type to gauge their effectiveness for the Emergency Exit Trunk Latch application.

CAPACITIVE DETECTORS

Cherry has located promising capacitive sensor technology from Quantum Research Group. A development board available from Quantum can sense small changes in the electrostatic field within an enclosed area, using a capacitive charge cancellation technique. Quantum embodies its capacitive sensing electronics in a relatively inexpensive integrated circuit, potentially bringing this technology into reach for the Emergency Exit Trunk Latch application.

SENSOR EVALUATION SYSTEM

In this quotation, Silicon Engines is bidding on the task of providing a system for doing preliminary evaluations of the IR and capacitive detector approaches.

1. **IR:** We will interface a pair of commercially available IR sensors to an analog amplifier that feeds an analog to digital converter on a 68HC11 microcontroller board. The MCU will serve as a data acquisition system. It will acquire IR input levels on a continuous sampled basis, and send the digitized values over a serial interface to a connected personal computer. Software within the PC will collect the samples, and apply three digital filters—slow, medium, and fast. These filters will be implemented digitally, in software, using an IIR (infinite impulse response) filter technique. Filtered changes in IR level will be compared against a threshold—a different threshold for each of the three filters. The software will consider that motion has been detected if the change exceeds the appropriate threshold. The PC software will plot a real-time graph of filtered IR levels on the screen. The PC software will also allow the user to modify the filter time constants, as well as the detection thresholds.
2. **Capacitive:** We will interface a development board available from Quantum Research Group to a connected personal computer. The PC software will collect and analyze samples in the same manner as for the IR system.

In addition, Silicon Engines proposes to do a very preliminary investigation on published information relating to these two sensor techniques:

1. **IR:** Check published articles in the Sensor Magazine database. Do a quick patent search using the public patent database on the Internet.
2. **Capacitive:** Check for published articles. Read over the U.S. patents issued to Quantum Research, including (Note that the same inventor was issued in on an electrostatic detection system for actuating a lavatory faucet.)

The purpose of this literature search is to broaden our understanding of the available technology.

DEVELOPMENT COSTS

Silicon Engines is proposing to carry out these activities on a time and materials basis. We are proposing a budget as follows:

NO.	TASKS	BY	HOURS	RATE	COST	TOTALS
1.	DESIGN HARDWARE, TEST SYSTEM	JEFF HUNSINGER	120	$80.00	$9,600	
2.	ASSIST WITH SYSTEM DESIGN	MITCH BUDNIAK	32	$80.00	$2,560	
3.	PC SOFTWARE	PAUL BERLAND	40	$65.00	$ 2,600	
4.	TECHNICIAN SERVICES	STAFF	24	$45.00	$ 1,080	
5.	ASSIST WITH PROJECT MANAGEMENT	KERRY BERLAND	24	$80.00	$1,920	
6.	SUBTOTAL, SILICON ENGINES STAFF					$17,760
7.	68HC11 CIRCUIT BOARD	SILICON ENGINES			$200	
8.	SENSORS, MISC. PARTS	SUPPLIERS			$200	
9.	SUBTOTAL, PARTS					$ 400
10.	TOTAL BUDGET					$18,160

Needed components and related supplies that are not provided by Cherry will be purchased by Silicon Engines, and will be invoiced at cost plus a 15% handling charge. Copies of receipts for all such purchases will be provided with the applicable invoice.

DELIVERY

Assuming that this project is authorized on or before . the evaluation systems will be ready for Cherry use by .

BILLINGS

Silicon Engines proposes to bill on a time and materials basis, submitting invoices at the end of each calendar month, or upon completion of a scheduled benchmark. Each invoice will show the name of the person doing the task, the date and hours spent, and a description of the task being worked on. Terms will be NET 30 DAYS. Invoices not paid within 30 days of issuance will be considered past due.

PROJECT PHASES

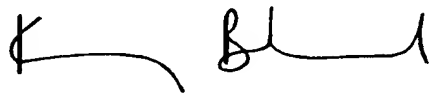
1. **Evaluation system:** Quoted by this letter.
2. **Sensor selection, design, and testing:** To be done by Cherry using the evaluation system quoted here. Silicon Engines can also quote assistance on this project phase.
3. **ECU design:** Design of the prototype Emergency Exit Trunk Latch electronic control unit. Silicon Engines has extensive experience with designs of this type of ECU. Will be quoted upon conclusion of the previous phases.

SUMMARY

We hope that you find this letter responsive to your request for proposal, Dan.

Silicon Engines hopes that we are selected to work with Cherry Automotive Sensor Group on this project, and believe we have the talent and resources to bring it to a successful conclusion. We are looking forward to your response.

Best regards,



Kerry Berland

SILICON ENGINES

Via email to dmattson@cherrycorp.com

Mr. Daniel Mattson
CHERRY AUTOMOTIVE
3600 Sunset Avenue
Waukegan, IL 60087

QUOTATION CQ981221

Dear Dan:

This letter is in response to your email message on regarding our earlier quotation CQ981215, on Cherry's **Emergency Exit Trunk Latch** project. This letter is a revised version of that quotation.

Silicon Engines very much appreciates the opportunity to quote on providing engineering assistance to Cherry Automotive relating to this Sensor Group project.

PROJECT DESCRIPTION

Cherry Automotive has become aware of the market need for an **Emergency Exit Trunk Latch,** a device intended to help prevent a small child from being inadvertently locked within the trunk of a car. In a typical scenario, an adult leaves the trunk open—for example, while unloading groceries. The child climbs into the trunk; the trunk closes; and the child cannot get out.

The simplest product would feature a lighted pushbutton switch—with a smiling face logo, or in the familiar shape of a doorknob—that the child could push to actuate the Emergency Exit Trunk Latch, opening the trunk. In fact, General Motors announced the availability of this type of product, as a retrofit kit, on

However, after studying the problem in an internal focus group, and discussing the issues with its customers, Cherry Automotive believes that an automatic sensor might significantly reduce the likelihood that the child could not escape. Cherry's Sensor Group has decided to investigate appropriate sensor technologies for an automatic version of the Emergency Exit Trunk Latch.

SENSOR OPTIONS

Cherry has been investigating several sensor technologies for their potential in this product. These include:

1. IR.
2. Capacitive.
3. CO_2.
4. Microwave.
5. Ultrasonic.

In our meeting at your offices on we agreed to focus initially on the first two—IR and capacitive.

INFRARED DETECTORS

IR detectors are widely used to detect motion. Commercially available products include anti-theft motion detectors within buildings, porch light motion detectors, and automatic water faucets in public lavatories. In this project, we plan to use IR detectors of this type to gauge their effectiveness for the Emergency Exit Trunk Latch application.

CAPACITIVE DETECTORS

Cherry has located promising capacitive sensor technology from Quantum Research Group. A development board available from Quantum can sense small changes in the electrostatic field within an enclosed area, using a capacitive charge cancellation technique. Quantum embodies its capacitive sensing electronics in a relatively inexpensive integrated circuit, potentially bringing this technology into reach for the Emergency Exit Trunk Latch application.

SENSOR EVALUATION AND DEMO SYSTEM

In this quotation, Silicon Engines is bidding on the task of providing a system for evaulating and demonstrating the IR and capacitive detector approaches.

1. **IR sensors:** We will interface a pair of commercially available IR sensors to an analog amplifier that feeds an analog to digital converter on a 68HC11 microcontroller board. The MCU will serve as a data acquisition system. It will acquire IR input levels on a continuous sampled basis, and send the digitized values over a serial interface to a connected personal computer. Software within the PC will collect the samples, and apply three digital filters—slow, medium, and fast. These filters will be implemented digitally, in software, using an IIR (infinite impulse response) filter technique. Filtered changes in IR level will be compared against a threshold—a different threshold for each of the three filters. The software will consider that motion has been detected if the change exceeds the appropriate threshold. The PC software will plot a real-time graph of filtered IR levels on the screen. The PC software will also allow the user to modify the filter time constants, as well as the detection thresholds.
2. **Capacitive sensors:** We will interface a development board available from Quantum Research Group to a connected personal computer. The PC software will collect and analyze samples in the same manner as for the IR system.
3. **Trunk space:** For test purposes we will mount the sensors within a space that approximates the size and shape of a vehicle trunk.
4. **Control interfaces:** In order to permit Cherry to demonstrate the action of an actual system, we will provide the following control interfaces:
    1. **Solenoid output:** An automotive relay for actuating the trunk release solenoid when the system detects motion within the trunk. (We propose to use a relay to provide a more robust interface for the demo system—though a production ECU would most likely use solid-state drive.)
    2. **Over-ride switch:** A control that the user actuates to disable the system after the trunk closes.
    3. **Trunk position switch:** A switch that indicates when the trunk is open or closed.
    4. **Time-out feature:** A timer—implemented in software—that disables the emergency exit feature after a delay period following the closing of the trunk. This delay period will be programmable from the PC.

LITERATURE SEARCH

As part of the project, Silicon Engines proposes to do a very preliminary investigation on published information relating to these two sensor techniques:

1. **IR:** Check published articles in the Sensor Magazine database. Do a quick patent search using the public patent database on the Internet.

2. **Capacitive:** Check for published articles. Read over the U.S. patents issued to Quantum Research, including . (Note that the same inventor was issued in on an electrostatic detection system for actuating a lavatory faucet.)

The purpose of this literature search is to broaden our understanding of the available technology.

WRITTEN SPECIFICATION

Also as part of the project, Silicon Engines proposes to generate a written Cherry Automotive Marketing Specification that describes the purpose and functionality of the Emergency Exit Trunk Latch system for Cherry's customers. Its general appearance and scope will be similar to marketing specifications prepared previously for Cherry.

PATENT DISCLOSURE

Provided that our demonstration system appears to have commercial potential, Silicon Engines will prepare a preliminary written technology disclosure that Cherry can use to explore the feasibility of a patent application. Patent rights for the Emergency Exit Trunk Latch system will be proprietary to Cherry.

DEVELOPMENT COSTS

Silicon Engines is proposing to carry out these activities on a time and materials basis. We are proposing a budget as follows:

NO.	TASKS	BY	HOURS	RATE	COST	TOTALS
1.	DESIGN HARDWARE, TEST SYSTEM	JEFF HUNSINGER	200	$80.00	$16,000	
2.	ASSIST WITH SYSTEM DESIGN	MITCH BUDNIAK	40	$80.00	$3,200	
3.	PC SOFTWARE	PAUL BERLAND	48	$65.00	$ 3,120	
4.	TECHNICIAN SERVICES	STAFF	32	$45.00	$1,440	
5.	WRITE SPECS, ASSIST WITH PROJECT MANAGEMENT	KERRY BERLAND	40	$80.00	$3,200	
6.	SUBTOTAL, SILICON ENGINES STAFF					$26,960
7.	68HC11 CIRCUIT BOARD	SILICON ENGINES			$200	
8.	SENSORS, MISC. PARTS	SUPPLIERS			$400	
9.	SUBTOTAL, PARTS					$ 600
10.	TOTAL BUDGET					$27,560

Needed components, supplies, and out-of-town travel that are not provided by Cherry will be purchased by Silicon Engines and will be invoiced at cost plus a 15% handling charge. Copies of receipts for all such purchases will be provided with the applicable invoice.

DELIVERY

Assuming that this project is authorized on or before the demonstration system will be ready for Cherry use by

BILLINGS

Silicon Engines proposes to bill on a time and materials basis, submitting invoices at the end of each calendar month, or upon completion of a scheduled benchmark. Each invoice will show the name of the person doing the task, the date and hours spent, and a description of the task being worked on. Terms will be NET 30 DAYS. Invoices not paid within 30 days of issuance will be considered past due.

PROJECT PHASES

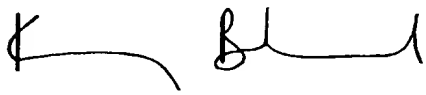
1. **Phase 1:** Sensor evaluation and demonstration system: Quoted by this letter.
2. **Phase 2:** ECU design: Design of a prototype Emergency Exit Trunk Latch electronic control unit. Silicon Engines has extensive experience with designs of this type of ECU. Will be quoted upon conclusion of the previous phase.

SUMMARY

We hope that you find this letter responsive to your original request for proposal, Dan, and to your email message on .

Silicon Engines hopes that we are selected to work with Cherry Automotive Sensor Group on this project, and believe we have the talent and resources to bring it to a successful conclusion. We are looking forward to your response.

Best regards,



Kerry Berland

SILICON ENGINES

INVOICE 1727

Sold to: Cherry Automotive
3600 Sunset Ave.
Waukegan, IL 60087
ATTN.: **Mr. Dan Mattson**
CC: Virginia Anthony, Accounts Payable

Project: Emergency Exit Trunk Latch project per Silicon Engines quote #CQ981221 and Cherry purchase order #1000141835. Covers consulting hours through

BY	DESCRIPTION	QTY.	COST EACH	AMT. EXT.
KSB	Project management & specs (see attached)	4.50	$80.00	$360.00
JJH	Hardware & software (see attached)	38.00	$80.00	$3,040.00
			TOTAL	**$3,400.00**

$3,400.00 due at this time.

Terms: **Net 15 days.**

Thank you.

Julie Shearer
julie@siliconengines-ltd.com

DETAILED INVENTORY OF TIME BILLED:

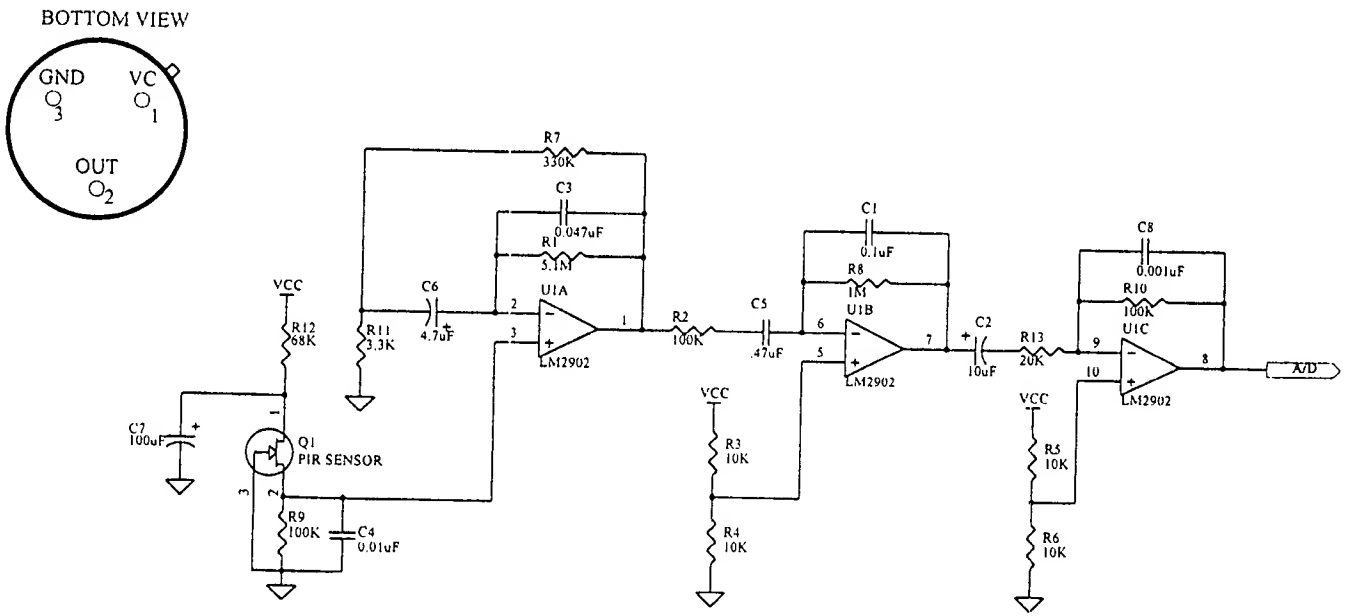
Kerry Berland's time consisted of the following:

DATE	DESCRIPTION	HOURS
	Patent search on capacitive detection; check article list in *Sensor*	2.00
	Search & review GM latch release on Internet	1.50
	Discuss plans for test chamber	1.00
	TOTAL TIME:	4.50

Jeff Hunsinger's time consisted of the following:

DATE	DESCRIPTION	HOURS
	Meeting	3.50
	Discuss project	1.00
	Discuss project; experiment with capacitive sensor	2.00
	Research passive IR	4.00
	Develop passive IR circuit; map out software; start building proto	7.50
	Build prototype and test	8.00
	Get working prototype; write software; discuss specification	6.00
	Upgrade Rev. 1 JEN11 PCBs	4.00
	Software; build relay board	2.00
	TOTAL TIME:	38.00

2101 OXFORD ROAD
DES PLAINES, IL 60018-1919 USA
847-803-6860
FAX 847-803-6870



Title: Trunk Occupancy Sensor		
Size: Letter	Number: PIR Sensor Interface	Revision: A
Sheet 1 of 1	Drawn By: JJH	